

(12) INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

(19) World Intellectual Property Organization  
International Bureau



(43) International Publication Date  
3 April 2003 (03.04.2003)

(10) International Publication Number  
PCT WO 03/027431 A3

(51) International Patent Classification<sup>7</sup>: E21B 43/26,  
C09K 3/00

(21) International Application Number: PCT/US02/30202

(22) International Filing Date:  
24 September 2002 (24.09.2002)

(25) Filing Language: English

(26) Publication Language: English

(30) Priority Data:  
60/325,071 26 September 2001 (26.09.2001) US  
60/340,224 7 December 2001 (07.12.2001) US

(71) Applicant and

(72) Inventor: COOKE, Claude, E., Jr. [US/US]; 197 Lake  
View Circle, Montgomery, TX 77356 (US).

(74) Agent: COOKE, Claude, E., Jr.; Baker Botts L.L.P.,  
910 Louisiana Street, One Shell Plaza, Houston, TX 77002  
(US).

(81) Designated States (national): AE, AG, AL, AM, AT, AU,  
AZ, BA, BB, BG, BR, BY, BZ, CA, CH, CN, CO, CR, CU,

CZ, DE, DK, DM, DZ, EC, EE, ES, FI, GB, GD, GE, GH,  
GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC,  
LK, LR, LS, LT, LU, LV, MA, MD, MG, MK, MN, MW,  
MX, MZ, NO, NZ, OM, PH, PL, PT, RO, RU, SD, SE, SG,  
SI, SK, SL, TJ, TM, TN, TR, TT, TZ, UA, UG, UZ, VN,  
YU, ZA, ZM, ZW.

(84) Designated States (regional): European patent (AT, BE,  
BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR, IE, IT,  
LU, MC, NL, PT, SE, SK, TR).

Declaration under Rule 4.17:

— as to the identity of the inventor (Rule 4.17(i)) for all des-  
ignations

Published:

— with international search report  
— before the expiration of the time limit for amending the  
claims and to be republished in the event of receipt of  
amendments

(88) Date of publication of the international search report:  
19 June 2003

For two-letter codes and other abbreviations, refer to the "Guid-  
ance Notes on Codes and Abbreviations" appearing at the begin-  
ning of each regular issue of the PCT Gazette.

WO 03/027431 A3

(54) Title: METHOD AND MATERIALS FOR HYDRAULIC FRACTURING OF WELLS

(57) Abstract: Hydraulic fracturing of wells by injecting a degradable polymer phase as a fracturing fluid is provided. Composition and degree of polymerization of the degradable polymer and the selection of additives may be varied to adjust the viscosity, degradation time and other properties of the fracturing fluid. Viscous degradable fluid or pellets of degradable polymer may be placed in a wellbore as an internal phase in a low viscosity carrier fluid. A polymer-continuous liquid phase may be formed at a selected location in the wellbore, usually near perforations, before the polymer phase is pressured into a formation to form a hydraulic fracture.

# INTERNATIONAL SEARCH REPORT

International application No.

PCT/US02/30202

<b>A. CLASSIFICATION OF SUBJECT MATTER</b> IPC(7) : E21B 43/26; C09K 3/00 US CL : 166/308; 507/209, 219, 221, 922, 924 According to International Patent Classification (IPC) or to both national classification and IPC		
<b>B. FIELDS SEARCHED</b> Minimum documentation searched (classification system followed by classification symbols) U.S. : 166/308; 507/209, 219, 221, 922, 924  Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched  Electronic data base consulted during the international search (name of data base and, where practicable, search terms used) EAST		
<b>C. DOCUMENTS CONSIDERED TO BE RELEVANT</b>		
Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	US 5,699,860 A (GRUNDMANN) 23 December 1997 (23.12.1997), Example 1 and column 4, lines 22-27.	24, 25, 30-32
X	US 5,439,059 A (HARRIS et al) 08 August 1995 (08.08.1995), column 6, lines 39-45.	1, 2, 4, 5, 7, 9, 11, 16, 17, 21-23
X	US 4,417,989 A (HUNTER) 29 November 1983 (29.11.1983), column 6, lines 36-47.	24, 25, 30
A	US 4,715,967 A (BELLIS et al) 29 December 1987 (29.12.1987) see claims.	1-23
<input type="checkbox"/> Further documents are listed in the continuation of Box C. <input type="checkbox"/> See patent family annex.		
* Special categories of cited documents:		
"A"	document defining the general state of the art which is not considered to be of particular relevance	"T" later documents published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention
"E"	earlier application or patent published on or after the international filing date	"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone
"L"	document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)	"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art
"O"	document referring to an oral disclosure, use, exhibition or other means	"&" document member of the same patent family
"P"	document published prior to the international filing date but later than the priority date claimed	
Date of the actual completion of the international search 10 March 2003 (10.03.2003)		Date of mailing of the international search report <b>07 APR 2003</b>
Name and mailing address of the ISA/US Commissioner of Patents and Trademarks Box PCT Washington, D.C. 20231 Facsimile No. (703)305-3230		Authorized officer Philip C Tucker Telephone No. 703-308-0651